

Appl. No. 10/770,619
Reply to Office Action of September 27, 2005

REMARKS/ARGUMENTS

The subject matter of claim 20 is introduced into the independent claims. This is the ratio of particles to binder. Claim 20 is cancelled.

The Examiner rejects the present claims as obvious over Held et al. in view of Liu et al. or Kobayashi et al.

In the AMENDMENT filed July 14, 2005 it was pointed out that Held et al. discloses a different type of ink jet recording sheet. The recording sheet disclosed in Held et al. does not include a hydrophilic binder which is cross-linked with ionizing radiation.

The Examiner does not agree with this characterization of the art.

The cross-linked hydrophilic binder has an important effect of forming a uniform porous layer which results a high void ratio having higher ink-absorbability and higher resistance to creases and cracks of film by a smaller amount of the binder (i.e. a weight ratio of the micro particles of silica to the binder in

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the porous layer is increased). Held et al. does not disclose the cross-linked hydrophilic binder or that the degree of polymerization should meet the requirements of, e.g., claims 8-10, of at least 500.

With respect to the cross-linked hydrophilic binder the Examiner states that

"the polymer will be crosslinked through side chains as instantly claimed, even if, at the same time, the ink is fixed in the layer".

In the present claims, the weight ratio of the micro particles of silica to the binder in the porous layer is specified as in original claim 20, i.e., 2.5:1 to 20:1. None of Held et al., Liu et al. and Kobayashi et al. disclose this ratio or suggest its importance.

With respect to the ratio, the Examiner does not agree that the importance of the ratio is not disclosed in Held et al. The Examiner points to Held et al. for disclosure that

"a ratio of filler to polymer will vary with the particular components and substrate, but generally be within the range of 7 to 1, to 0.5 to 1 (col.10, lines 7-11).

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However, the ratio does not overlap with the ratio required by the instant claims, of 2.5:1 to 20:1. The reason for this is as explained below.

The ratio described in Held et al. is not the ratio of filler to cross-linked polymer as claimed, but filler to non-cross-linked polymer since Held et al. discloses that the irradiation for cross-linking the binder is not necessary when preparing the ink-jet recording sheet. Accordingly, none or at least little of the binder is cross-linked and therefore, the ratio of filler to cross-linked polymer estimated by one of ordinary skill in the art should be well below the claimed range of the ratio.

In Examples of specification recording sheets A-I to A-10 and E-1 to E-10 show unexpected results. Recording sheets A-1 to A-10 (inventive) include a porous layer having the cross-linked polymer obtained by irradiation. Recording sheets E-1 to E-10 (comparative) include a porous layer having non-cross-linked polymer. When one compares A-1 to A-10 and E-1 to E-10 there are clearly major gaps in view of smoothness, crack resistance, ink absorptive property, resistance to stresses and cracks, dimensional stability and black density.

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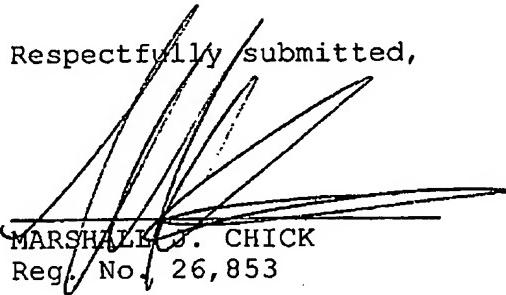
In view of the above, it is not obvious for one of ordinary skill in the art to reach the claimed inventions even if he or she combines Held et al. with Liu et al. and/or Kobayashi et al. because the references do not disclose the weight ratio of the micro particles of ground silica to the hydrophilic binder in the porous layer of 2.5:1 to 20:1, or a reason to optimize to such a ratio.

Furthermore the references do not disclose the unexpected results above mentioned.

As to the double patenting, if the nature of allowed subject matter requires it and it is otherwise appropriate, applicants will file a Terminal Disclaimer.

In view of the above, it is submitted that the present invention is not shown or suggested by the cited art. Withdrawal of the rejections and allowance of the application are respectfully requested.

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